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graph TD
    201[Init CSS] --> 202[Receive Mail]
    202 --> 203{Known User Y/N}
    203 -- No --> 201
    203 -- Yes --> 204[Convert to HTML, HT-Lite and store in appropriate structure]
    204 --> 205{Forwarded Privately - Y/N}
    205 -- No --> 206[Store Data base w/ all messages]
    205 -- Yes --> 207[Send Mail]
    207 --> 208[User and Priv Profile Expansion log & Accounting Info]
    208 --> 209[User and Priv check Profile after change]
    209 -- OK --> 210[Web Access]
    209 -- No --> 201
    210 --> 211[User and Priv check Profile after change]
    211 -- OK --> 212[View list of available messages]
    211 -- No --> 201
    212 --> 213[View and answer message]
    213 --> 214{More Y/N}
    214 -- No --> 201
    214 -- Yes --> 215[User and Priv check Profile and change]
    215 --> 216[View list of available messages]
    216 --> 217{Listen to and answer messages}
    217 --> 218{More Y/N}
    218 -- No --> 201
    218 -- Yes --> 215
    221[Receive User Mail & Fax] --> 222{Known User Y/N}
    222 -- No --> 221
    222 -- Yes --> 223{Receive Inquiry?}
    223 -- No --> 224[Convert to HTML, HT-Lite and store in appropriate structure]
    223 -- Yes --> 225[Store Data base w/ all messages]
    224 --> 226{Forwarded Privately - Y/N}
    226 -- No --> 227[S-Mail Phone?]
    226 -- Yes --> 228[Send Mail]
    227 --> 229[Call Out]
    228 --> 229
    229 --> 230[User and Priv check Profile and change]
    230 --> 231[View list of available messages]
    231 --> 232{Listen to and answer messages}
    232 --> 233{More Y/N}
    233 -- No --> 221
    233 -- Yes --> 230
  
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The flowchart illustrates a system for processing incoming messages and handling user requests. It starts with an initialization step (201) leading to a 'Receive Mail' process (202). A decision is made (203) if the user is known. If not, it loops back to initialization. If yes, the message is converted to HTML/HT-Lite and stored (204). A decision (205) is made if the message is forwarded privately. If no, it's stored in a database (206). If yes, it's sent (207) and logged (208). The user's profile is checked (209). If OK, web access is provided (210). If not, it loops back to initialization. The user checks their profile (211). If OK, they view messages (212). If not, it loops back to initialization. They view and answer a message (213). A decision (214) is made if there are more messages. If no, it loops back to initialization. If yes, the user's profile is checked and changed (215). They view messages (216). They listen to and answer messages (217). A decision (218) is made if there are more messages. If no, it loops back to initialization. If yes, the profile is checked and changed (215). The process then moves to 'Receive User Mail & Fax' (221). A decision (222) is made if the user is known. If not, it loops back to 221. If yes, a decision (223) is made if it's an inquiry. If no, it's converted and stored (224). If yes, it's stored in a database (225). A decision (226) is made if the message is forwarded privately. If no, a decision (227) is made if it's an S-Mail Phone. If yes, it's sent (228) and a call is made (229). If no, it's sent (228). The user's profile is checked and changed (230). They view messages (231). They listen to and answer messages (232). A decision (233) is made if there are more messages. If no, it loops back to 221. If yes, the profile is checked and changed (230).

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Integrated Services on IntraNet and Internet

Field of the Invention

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The present invention is in the area of multimedia document handling and cross-media access of such documents based both on Internet, Intranet and Telephony networks.

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Cross Reference to related Applications

This disclosure is related to patent application 08/629,475 by the same inventor.

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Background of the Invention

Today many different electronic services are available for communication. Such services include, but are not necessarily limited to voice-mail, e-mail, paging, alpha paging, cellular phones, paging phones, fax machines and so forth. There are also cross-linked services available, such as paging on digital cell phones, and the like. In general, however, each type of media is limited to one access, usually in very primitive manner.

Recently Motorola announced e-mail on cellular telephones: To use this service, a user calls a special number, and the saved e-mail is read over the phone to the user. Such a service may be helpful in some cases, while not be very helpful in others. If, for example, a spreadsheet is attached, the spreadsheet cannot be read over the phone. Even if a spreadsheet could be converted, reading potentially hundreds of numbers over the phone will most likely result in several transcription errors, rendering the result basically useless.

What is needed are better devices and better methods, crossing traditional media boundaries.

One simple way to offer integrated services is to use a database on a server that is connected to the World Wide Web (WWW). Then, when data is requested, that data is called by invoking a so-called CGI-application (these are applications that are launched by a web page). The CGI application then sorts out data, and presents the result as a dynamically-built web page. During a Comdex show on about November 14, 1995 Lotus, Inc. announced such a program for their Notes product. This addition allows users to read Notes. Others have followed since.

The problem remaining with such solutions is that most of them are proprietary and also slow, meaning that only a very limited number of users can be serviced concurrently by one server. This is partly because a CGI application has to be launched for every request, invoking a database inquiry, which in all cases consumes substantial computer power and time.

Summary of the Invention

In a preferred embodiment of the present invention a web-server system for processing and providing digital documents, comprising: a receiver-converter for receiving digital documents and converting the digital documents to Hyper Text Markup Language (HTML) format; a directory structure providing a database; and an index listing the contents of the database by directory structure. Upon receipt of a digital document, the receiver-converter converts the digital document into HTML format and stores it in the directory structure, and updates the index. In some embodiments the system further comprises an access program wherein database directories are assigned to individual users and displayed as web pages. In this embodiment attachments to incoming e-mail are related to stored mail as hyperlinks to the web page.

A method is provided comprising steps of (a) making a database on a server composed of directories assigned to users; (b) receiving digital documents at the server; (c) converting the digital documents to Hypertext Markup Language (HTML) format; and (d) storing the HTML digital documents in the directories. In some embodiments the method further comprises steps for: (e) receiving a request from a

user; (f) retrieving a document from the database in HTML format; and (g) transmitting the document to the user over the Internet.

In various embodiments, assuming servers of relatively equal computing power, by using a directory structure instead of an integrated database, and pre-
5 converting documents to HTML format prior to storing for later retrieval by a user, more users can be served at a faster pace than can be served in conventional systems.

Brief Description of the Drawing Figures

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Fig. 1 is a generalized topology example showing arrangement and connectivity of equipment in an embodiment of the present invention.

Fig. 2 is a flowchart illustrating processes and operations in practicing embodiments of the present invention.

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Description of the Preferred Embodiments

The present invention in various embodiments differs from the prior art in that
20 a database is not used, as described above in the Background section. When a database is used with the Internet (WWW), once data is extracted, it must be converted to HTML (Hyper Text Markup Language) before the data can be transmitted on the Internet. This is typically done as a function of the CGI application called. Instead, in embodiments of the present invention, the digital documents
25 (mails) are as HTML files in a directory structure representing the database. In addition, in some embodiments, even the index is kept in a HTML file, and the index is continuously updated as messages come in.

In an alternative embodiment small downloadable modules, in technologies such as JAVA or similar, are provided on a server connected to the WWW. A user
30 first downloads the HTML index and a small application to handle it, then executes actual index searches on the user machine. Once a file or files are located in the index a request is set over the Internet to access the file or files from the server

In one embodiment the existing "Send Mail of the UNIX operating system on a server is modified in a way that incoming mail is converted into HTML files, and then stored in appropriate pre-arranged directories. An index file is then updated. If the incoming mail has attachments, they are stored in the same directory and can have a hyperlink from the mail page. A user may then either view or download the attachment(s).

Additional functions, such as address book, sending mail etc. are provided in embodiments of the invention by using a Java applet having a relatively small user interface. The applet can directly access files containing addresses and insert them into messages and so forth.

In some embodiments of the invention, to facilitate adding of addresses, the addresses can be marked as well on the message, and by clicking on the addresses a user can cause the addresses to be transferred into the list. The address list also contains, in some embodiments, phone numbers and addresses (snail mail), that can be launched into other applications such as a phone dialer. This feature is very attractive in conjunction with such things as voice-mail, video-mail etc. Players and auxiliary tools may be launched to connect a user with a calling party, or to allow a user to leave voice-mail and or video-mail messages.

On the receiving end, where a user is using a system according to an embodiment of the present invention, voice-mail and video-mail are converted when received into one or several 'standard' formats, so that when the user wants to view it, no long delays are incurred. Without this feature a user may have to launch a CGI-controlled search through a database, followed by on-the-fly conversion, which can consume a substantial amount of CPU power.

In embodiments of the present invention all files are prepared when arriving, such that the user when checking, can just browse. By using an HTTPS server, security is provided by standards already established on the Internet. This feature allows more users on a single server, which ultimately reduces costs dramatically.

In an ideal setup, the user can go to a web-page, and open his own account all by himself, since only name, password and credit card (or some other form of payment) are needed. There are no IP addresses etc. to worry about. Additionally, The user may also open up his own web page much like the same web-page referred to

above, and then upload through a secure HTTPS transaction new pages that he created on his own system.

It will be apparent to those with skill in the art that there are many alterations that might be made in the embodiments described without departing from the spirit and scope of the invention. For example, there are many ways directory structures
5 may be provided and many ways individual programmers might furnish code to accomplish the modules of the invention. There are similarly many sorts of platforms and data links that may be used in practicing embodiments of the invention. The invention is limited in scope only by the claims which follow.

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What is claimed is:

1. A web-server system for processing and providing digital documents, comprising:
a receiver-converter for receiving digital documents and converting the digital
5 documents to Hyper Text Markup Language (HTML) format;
a directory structure providing a database; and
an index listing the contents of the database by directory structure;
wherein, upon receipt of a digital document, the receiver-converter converts
the digital document into HTML format and stores it in the directory structure, and
10 updates the index.
2. A web-server system as in claim 1 further comprising an access program wherein
database directories are assigned to individual users and displayed as web pages.
- 15 3. A web-server system as in claim 1 wherein attachments in incoming e-mail are
related to stored mail as hyperlinks to the web page.
4. A method for providing integrated digital document services to users, comprising
steps of:
20 (a) making a database on a server composed of directories assigned to users;
(b) receiving digital documents at the server;
(c) converting the digital documents to Hypertext Markup Language (HTML)
format; and
(d) storing the HTML digital documents in the directories.
- 25 5. The method of claim 4 further comprising steps for:
(e) receiving a request from a user;
(f) retrieving a document from the database in HTML format; ad
(g) transmitting the document to the user over the Internet.

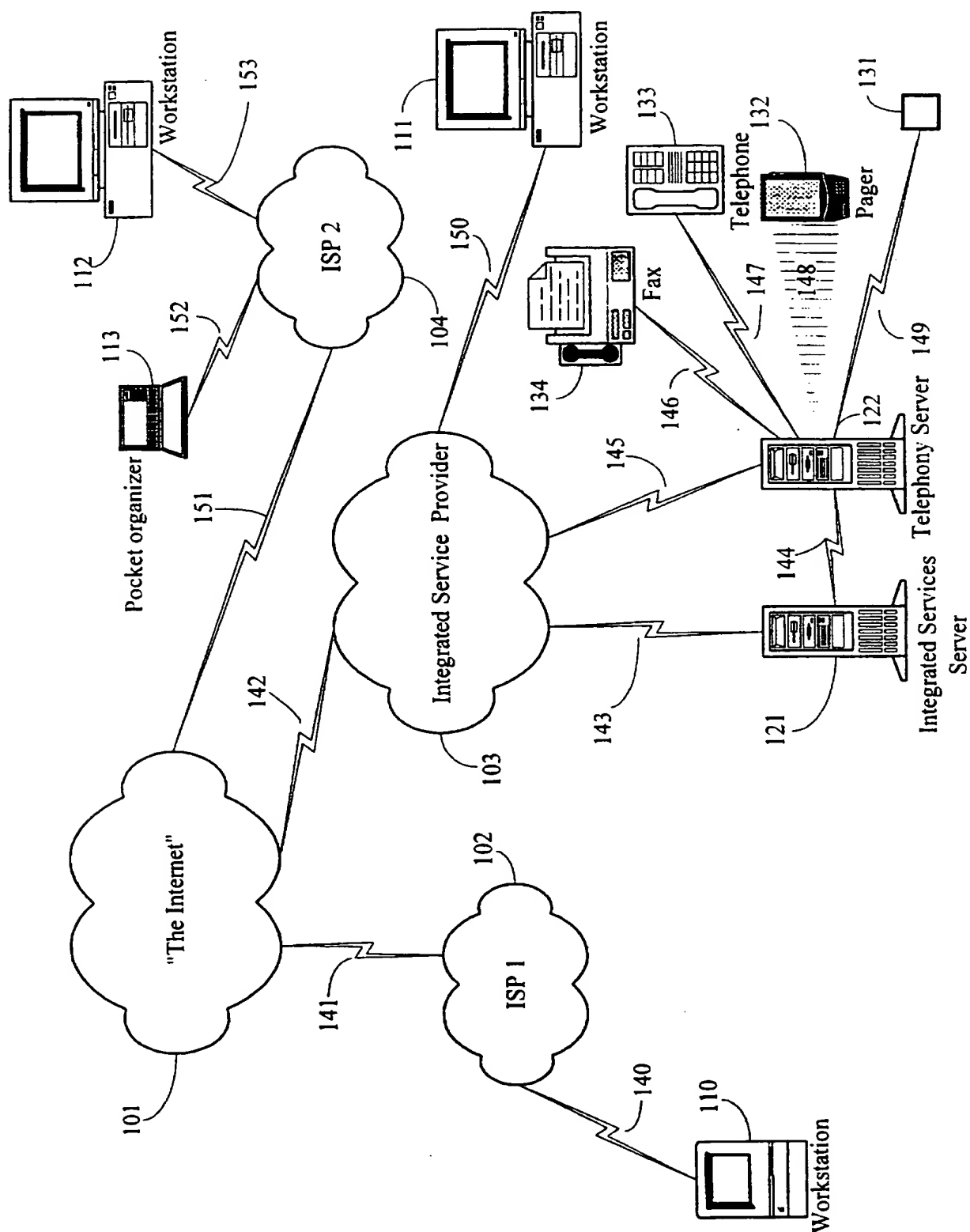


Fig. 1 - Topology Example

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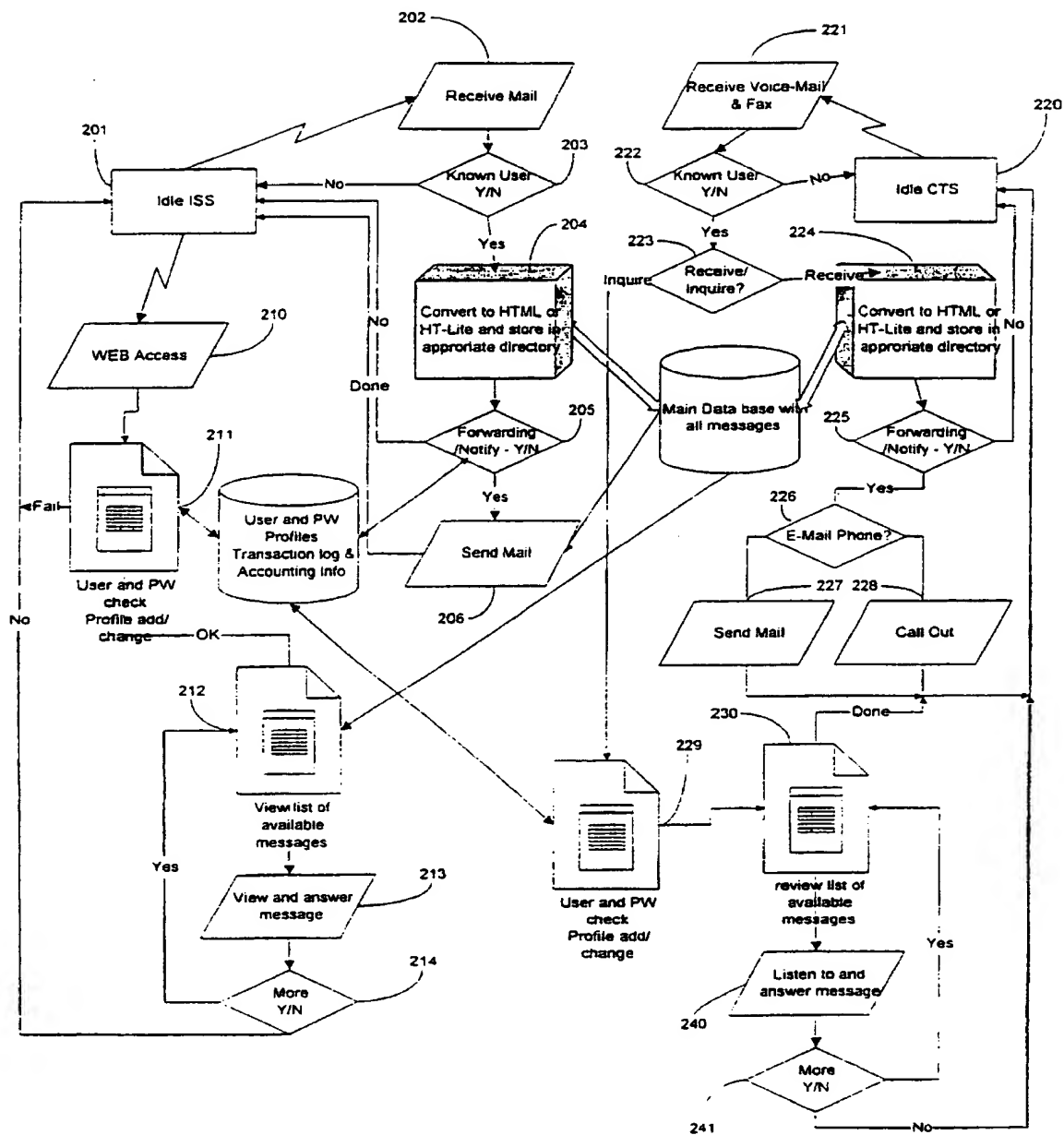


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/12628**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) :G06F 17/40

US CL :395/774

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 395/774,762, 610; 358/402, 403

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

IEEE CD-ROM, Computer Select 1995-1996 CD-ROM, APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y,E	US 5,654,886 A (ZERESKI ET AL.) 05 AUGUST 1997 (5.8.97) SEE ABSTRACT	1-5
Y,P	US 5,627,997 A (PEARSON ET AL.) 06 MAY 1997 (6.5.97) SEE ABSTRACT	1-5
Y,P	US 5,623,589 A (NEEDHAM ET AL.) 22 APRIL 1997 (22.4.97) SEE ABSTRACT	1-5
Y,P	US 5,608,874 A (OGAWA ET AL.) 04 MARCH 1997 (4.3.97) SEE ABSTRACT	1-5
Y,P	US 5,608,446 A (CARR ET AL.) 04 MARCH 1997 (4.3.97) SEE ABSTRACT	1-5



Further documents are listed in the continuation of Box C.



See patent family annex.

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Y	KIKUCHI ET AL., USER INTERFACE FOR A DIGITAL LIBRARY TO SUPPORT CONSTRUCTION OF A VIRTUAL PERSONAL LIBRARY, PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON MULTIMEDIA COMPUTING AND SYSTEMS, 17 JUNE 1996, P. 429-432 , SEE P.429	1-5
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